



**CALIFORNIA
ENERGY COMMISSION**



**California Energy Commission
January 21, 2025 Business Meeting
Backup Materials for The Regents of the University of California, on behalf of the
San Diego Campus**

The following backup materials for the above-referenced agenda item are available in this PDF packet as listed below:

1. Proposed Resolution
2. Grant Request Form
3. Scope of Work

[PROPOSED]

RESOLUTION NO: 25-121-03i

STATE OF CALIFORNIA

**STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION**

RESOLUTION: The Regents of the University of California, on behalf of the San Diego Campus

RESOLVED, that the State Energy Resources Conservation and Development Commission (CEC) adopts the staff CEQA findings contained in the Agreement or Amendment Request Form (as applicable); and

RESOLVED, that the CEC approves agreement EPC-24-031 with The Regents of the University of California, on behalf of the San Diego Campus for a \$2,820,083 grant. This agreement will demonstrate the use of mobile batteries for charging electric construction equipment and providing backup power for an existing microgrid. The project will develop a model to optimize charging schedules for electric construction equipment, reduce peak demand, and increase utilization of existing grid capacity and charging infrastructure; and

FURTHER BE IT RESOLVED, that the Executive Director or their designee shall execute the same on behalf of the CEC.

CERTIFICATION

The undersigned Secretariat to the CEC does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the CEC held on January 21, 2025.

AYE:

NAY:

ABSENT:

ABSTAIN:

Dated:

Kristine Banaag
Secretariat



GRANT REQUEST FORM (GRF)

A. New Agreement Number

IMPORTANT: New Agreement # to be completed by Contracts, Grants, and Loans Office.

New Agreement Number: EPC-24-031

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Ran Laviv
3. MS-:51
4. Phone Number: 916-258-2951

C. Recipient's Information

1. Recipient's Legal Name: The Regents of the University of California, on behalf of the San Diego campus
2. Federal ID Number: 95-2872494

D. Title of Project

Title of project: Green Construct Charge (GCC): Grid-Supportive Mobile Charging Stations for the Electrification and Decarbonization of Construction Electric Vehicles

E. Term and Amount

1. Start Date: 03/01/2025
2. End Date: 02/29/2028
3. Amount: \$2,820,083.00

F. Business Meeting Information

1. Are the ARFVTP agreements \$75K and under delegated to Executive Director? No
2. The Proposed Business Meeting Date: 1/21/2025.
3. Consent or Discussion? Consent
4. Business Meeting Presenter Name: Ran Laviv
5. Time Needed for Business Meeting: 0 minutes.
6. The email subscription topic is: EPIC (Electric Program Investment Charge).

Agenda Item Subject and Description:

The Regents of the University of California, on behalf of the San Diego campus.

Proposed resolution approving agreement EPC-24-031 with The Regents of the University of California, on behalf of the San Diego Campus for a \$2,820,083 grant, and adopting staff's recommendation that this action is exempt from CEQA. This agreement will demonstrate the use of mobile batteries for charging electric construction equipment and providing backup power for an existing microgrid. The project will develop a model to optimize charging schedules for electric construction equipment, reduce peak demand, and increase utilization of existing grid capacity and charging infrastructure. (EPIC Funding) Contact: Ran Laviv

G. California Environmental Quality Act (CEQA) Compliance



1. Is Agreement considered a “Project” under CEQA?

Yes

If yes, skip to question 2.

If no, complete the following (PRC 21065 and 14 CCR 15378) and explain why Agreement is not considered a “Project”:

Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because:

2. If Agreement is considered a “Project” under CEQA answer the following questions.

a) Agreement **IS** exempt?

Yes

Statutory Exemption?

No

If yes, list PRC and/or CCR section number(s) and separate each with a comma. If no, enter “None” and go to the next question.

PRC section number: None

CCR section number: None

Categorical Exemption?

Yes

If yes, list CCR section number(s) and separate each with a comma. If no, enter “None” and go to the next question.

CCR section number: Cal. Code Regs., tit. 14, § 15302 ;

Common Sense Exemption? 14 CCR 15061 (b) (3)

No

If yes, explain reason why Agreement is exempt under the above section. If no, enter “Not applicable” and go to the next section.

California Code Regulations, title 14, section 15301 provides that projects which consist of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of existing or former use, are categorically exempt from the provisions of CEQA. This project involves the demonstration of existing mobile battery charging units at existing construction sites and existing electric vehicle charging stations on a university campus. The project activities involve negligible or no expansion of existing or former use and will not have a significant effect on the environment. The project is therefore exempt from the provisions of CEQA under section 15301.

California Code of Regulations, title 14, section 15303 provides that projects which consist of installation of small new equipment are exempt from the provisions of CEQA. This project involves the demonstration of mobile battery charging units at existing construction sites and existing electric vehicle charging stations on a university campus. The mobile charging units are small enough to be portable and



reside in a standard parking space. The project is therefore exempt from the provisions of CEQA under section 15303.

California Code of Regulations, title 14, section 15306 provides that projects which consist of basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource are categorically exempt from the provisions of CEQA. This project involves the collection of data, research, experimental management, and resource evaluation activities related to the development of a model for optimizing charging schedules for electric vehicle charging equipment. The project is therefore exempt from the provisions of CEQA under section 15306.

This project does not involve impacts on any particularly sensitive environment; does not involve any cumulative impacts of successive projects of the same type in the same place that might be considered significant; does not involve unusual circumstances that might have a significant effect on the environment; will not result in damage to scenic resources within a highway officially designated as a state scenic highway; the project site is not included on any list compiled pursuant to Government Code section 65962.5; and the project will not cause a substantial adverse change in the significance of a historical resource. Therefore, none of the exceptions to categorical exemptions listed in CEQA Guidelines section 15300.2 apply.

b) Agreement **IS NOT** exempt.

IMPORTANT: consult with the legal office to determine next steps.

No

If yes, answer yes or no to all that applies. If no, list all as “no” and “None” as “yes”.

Additional Documents	Applies
Initial Study	No
Negative Declaration	No
Mitigated Negative Declaration	No
Environmental Impact Report	No
Statement of Overriding Considerations	No
None	Yes

H. Is this project considered “Infrastructure”?

No

I. Subcontractors

List all Subcontractors listed in the Budget (s) (major and minor). Insert additional rows if needed. If no subcontractors to report, enter “No subcontractors to report” and “0” to funds.

Delete any unused rows from the table.



Subcontractor Legal Company Name	CEC Funds	Match Funds
Saniset NV, Inc.	\$ 295,000	\$0
Tyfast Energy Corp.	\$ 99,000	\$0

J. Vendors and Sellers for Equipment and Materials/Miscellaneous

List all Vendors and Sellers listed in Budget(s) for Equipment and Materials/Miscellaneous. Insert additional rows if needed. If no vendors or sellers to report, enter "No vendors or sellers to report" and "0" to funds. **Delete** any unused rows from the table.

Vendor/Seller Legal Company Name	CEC Funds	Match Funds
Mossy Ford, Inc.	\$0	\$27,000

K. Key Partners

List all key partner(s). Insert additional rows if needed. If no key partners to report, enter "No key partners to report." **Delete** any unused rows from the table.

Key Partner Legal Company Name
No key partners to report

L. Budget Information

Include all budget information. Insert additional rows if needed. If no budget information to report, enter "N/A" for "Not Applicable" and "0" to Amount. **Delete** any unused rows from the table.

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	23-24	301.001K	\$ 2,820,083

TOTAL Amount: \$ 2,820,083

R&D Program Area: ESB: Transportation

Explanation for "Other" selection Not applicable

Reimbursement Contract #: Not applicable

Federal Agreement #: Not applicable

M. Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Jenny Chavira

Address: 9500 Gilman Dr

City, State, Zip: La Jolla, CA 92093-0411



STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

Grant Request Form
CEC-270 (Revised 01/2024)

Phone: 858-534-3330

E-Mail: researchadmin@ucsd.edu

3. Recipient's Project Manager

Name: Yuanyuan Shi

Address: 9470 Medical Center Dr

City, State, Zip: La Jolla, CA 92037-1337

Phone: 206-966-1377

E-Mail: yyshi@ucsd.edu

N. Selection Process Used

There are three types of selection process. List the one used for this GRF.

Selection Process	Additional Information
Competitive Solicitation #	GFO-23-306
First Come First Served Solicitation #	Not applicable
Other	Not applicable

O. Attached Items

1. List all items that should be attached to this GRF by entering "Yes" or "No".

Item Number	Item Name	Attached
1	Exhibit A, Scope of Work/Schedule	Yes
2	Exhibit B, Budget Detail	Yes
3	CEC 105, Questionnaire for Identifying Conflicts	Yes
4	Recipient Resolution	No
5	Awardee CEQA Documentation	No

Approved By

Individuals who approve this form must enter their full name and approval date in the MS Word version.

Agreement Manager: Ran Laviv

Approval Date: Agreement Manager's Approval Date

Branch Manager: Reynaldo Gonzalez

Approval Date: 12/13/2024



STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

Director: Reynaldo Gonzalez

Approval Date: 12/13/2024

Grant Request Form
CEC-270 (Revised 01/2024)

Exhibit A
Scope of Work
The Regents of the University of California, on behalf of the San Diego campus

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2	X	Optimization Framework for Construction Electric Equipment (CEVs) Charging and Mobile Charging Stations (MCSs) Re-charging Schedule
3		Installation, Data Analytics and Modeling of MCSs and CEVs
4	X	MCS-To-CEV Testing and Demonstration
5		MCS-To-Grid Optimization and Demonstration during Emergency Situations
7		Evaluation of Project Benefits
8		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CCS	Combined Charging System
CEC	California Energy Commission
CEV	Construction Electric Equipment
CPR	Critical Project Review
DER	Distributed Energy Resources
EV	Electric Vehicle
MCS	Mobile Charging Station
TAC	Technical Advisory Committee
TRL	Technology Readiness Level
UCSD	University of California San Diego

II. PURPOSE OF AGREEMENT, PROBLEM/SOLUTION STATEMENT, AND GOALS AND OBJECTIVES

A. Purpose of Agreement

The purpose of this Agreement is to fund design, installation, commissioning and testing of Mobile Charging Stations (MCSs) that are compact and portable energy storage systems capable of charging Construction Electric Equipment (CEVs) at both on-grid construction sites yet lacking sufficient power capacity for fast charging of CEVs and off-grid construction sites. This research will demonstrate the potential reduction of air pollutants by upgrading heavy-duty construction equipment from internal combustion engines (ICEs) to electric equipment, the reduced operation cost and carbon emissions associated with CEV operation, as well as grid benefits of the MCS

¹ Please see subtask 1.3 in Part III of the Scope of Work (General Project Tasks) for a description of Critical Project Review (CPR) Meetings.

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solution for mitigating peak demand and distribution grid upgrade costs while meeting the charging demand of CEVs.

Problem/ Solution Statement

Problem

The electrification of heavy-duty vehicles that are responsible for over 8% of U.S. carbon emissions is a pivotal step toward decarbonizing both transportation and construction sectors. Since transitioning to electric requires significant investment in charging infrastructure, CEV charging strategies have been explored in several studies. Some suggest redistributing CEV charging across multiple charging stations to minimize waiting times and grid impacts. However, this approach is impractical for construction-related CEVs due to their high energy consumption during travel and significant time needed to reach charging stations. On the other hand, simultaneously charging all CEVs at the nearest charging station to conserve energy and reduce travel time would result in excessive charging loads and strain distribution grids. Given the scarcity of high-capacity charging stations, many businesses have installed their own stations at their facilities. However, this strategy is less effective for construction-related CEVs, which expend most of their energy on-site and need charging during operational hours.

In summary, current approaches are inadequate for addressing the unique challenges of CEV charging, which encompass rigid operational timelines, limited mobility, and substantial effects on grids. Beyond the necessity for grid enhancements, the significant expenses associated with leasing land for charging stations, prolonged wait times at charging stations, and considerable time and energy expended to access them underscore the urgency of exploring innovative CEV charging solutions for construction vehicle electrification and decarbonization.

Solution

This project will demonstrate efficient charging of a fleet of CEVs at several construction sites to align with the fleet's operational schedule while reducing the peak power demand, distribution grid upgrade costs, and carbon emissions.

The project will use two types of MCSs with different power capacities. These two systems are currently at TRL 5 and 6, respectively, and the project will advance these systems to TRL 7 and 8 through testing and demonstrations, culminating in versatile "plug and play" CEV charging systems. These systems are transportable, designed to be towed by a pickup truck multiple times daily. The first MCS is capable of delivering 60 kW of power and 250 kWh of energy. The project will advance the DC fast charger port (CCS1) in the MCS unit from TRL 6 to TRL 8 by conducting a field demonstration. The second MCS system is a next-gen mobile battery unit that will be developed and tested as part of the project to support fast CEV charging at 150 KW (TRL 5 to TRL 7). The MCSs support fast DC charging for various CEVs and can operate off-grid, all within the confines of a standard parking spot. The MCSs can also be re-charged at standard Level II and Level III EVSEs, operate entirely on renewable energy, and be integrated into a microgrid.

This project will develop and demonstrate a rapid charge battery system for CEVs, which is currently at TRL 4-5, and its performance will be evaluated by a demonstration in a prototype mini-excavator equipment in a laboratory setting. This work will advance the battery system to TRL 8 by the end of the project.

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These innovations will allow CEV charging to adapt to grid conditions, a key factor in achieving the state's electrification goals cost-effectively. Besides, using CEVs charged with green energy at construction sites instead of internal combustion engine vehicles will significantly reduce the carbon emissions, operation cost, and the air and noise pollutant levels of construction equipment.

Due to the distinct load and charging characteristics, current analyses fall short of depicting the grid consequences of CEV charging. To tackle this, the project will model the charging demands of CEVs at construction sites and create an optimization strategy to meet all charging needs using an MCS fleet, considering the constraints of CEVs and construction schedules. The project will develop algorithms to find the best charging rates and times for CEVs. This MCS-centered CEV charging solution will provide a replicable model for widespread adoption in different sites throughout the state, thus significantly contributing to the acceleration of California's transportation electrification objectives.

B. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Determine the optimal location, timing, and rates for CEVs charging and MCSs re-charging, subject to the construction schedule, power/energy capacity of CEVs and MCSs, and other physical constraints including the substation peak power capacity.
- Prove the benefits of CEVs over conventional internal combustion engine (ICE) construction equipment in terms of reduced operation costs, lower carbon emissions, and decreased air/noise pollutant levels.
- Prove the benefits of MCS over current fixed charging stations, in terms of peak demand reduction, deferred grid upgrade costs, and reduced charging time.
- Prove the benefits of MCSs for grid services including but not limited to increased utilization of existing EV charging stations, higher renewable self-consumption, and emergency building services by integration with the world-renowned UCSD microgrid.

Ratepayer Benefits:² This Agreement will result in the ratepayer benefits of greater electricity reliability and lower costs. The project will mitigate cost burdens on ratepayers by enabling the deployment of CEVs with MCSs that can leverage existing charging infrastructure and increase utilization of grid capacity. The MCSs can also be charged during off-peak periods to provide grid benefits such as peak shaving, valley filling, frequency regulation, power loss reduction, and reliability improvement. The MCS operator can also perform energy arbitrage and participate in demand response programs.

² California Public Resources Code, Section 25711.5(a) requires projects funded by the Electric Program Investment Charge (EPIC) to result in ratepayer benefits. The California Public Utilities Commission, which established the EPIC in 2011, defines ratepayer benefits as greater reliability, lower costs, and increased safety (See CPUC "Phase 2" Decision 12-05-037 at page 19, May 24, 2012, http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF).

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Technological Advancement and Breakthroughs:³ This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by advancing CEV charging technology. Commercialization of the MCS designs and optimization algorithms will reduce the barriers to widespread adoption of CEVs and MCSs, which will support decarbonization of both transportation and construction sectors, reduction in distribution grid upgrade and charging station infrastructure costs, and increase in renewable energy utilization.

Agreement Objectives

The objectives of this Agreement are to:

- Validate operations of MCSs for CEVs charging under regular construction activities for at least six months at multiple construction sites.
- **Reduce Costs and Emissions:**
 - Demonstrate at least 10% peak demand reduction and charging time reduction (including travel, waiting & actual charging time) by using mobile charging stations versus a fixed charging station benchmark for construction equipment charging.
 - Demonstrate at least 50% carbon emission reduction by using electric construction electric equipment versus internal combustion construction equipment.
- **MCS-to-Grid Benefits:** at least 5% increase in charging station utilization and renewable self-consumption, and validation of MCSs for building emergency services.
- **Technology Transfer:** Test the MCS-to-CEV solution with different use cases, including but not limited to different MCSs battery types, CEV types, and construction locations.

³ California Public Resources Code, Section 25711.5(a) also requires EPIC-funded projects to lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory and energy goals.

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The language in Task 1 is standard for each agreement. Do not revise it.

III. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V)**. All products submitted which will be viewed by the public, must comply with the accessibility requirements of Section 508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. Sec. 794d), and regulations implementing that act as set forth in Part 1194 of Title 36 of the Federal Code of Regulations. All technical tasks should include product(s). Products that require a draft version are indicated by marking “**(draft and final)**” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, “**days**” means working days.

The Recipient shall:

For products that require a draft version, including the Final Report Outline and Final Report

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For products that require a final version only

- Submit the product to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

For all products

- Submit all data and documents required as products in accordance with the following:

Instructions for Submitting Electronic Files and Developing Software:

○ **Electronic File Format**

- Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the California Energy Commission’s (CEC) software and Microsoft (MS)-operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick.

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The following describes the accepted formats for electronic data and documents provided to the CEC as products under this Agreement, and establishes the software versions that will be required to review and approve all software products:

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
 - Text documents will be in MS Word file format, version 2007 or later.
 - Project management documents will be in Microsoft Project file format, version 2007 or later.
- **Software Application Development**
Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:
- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
 - Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
 - Visual Studio.NET (version 2008 and up). Recommend 2010.
 - C# Programming Language with Presentation (UI), Business Object and Data Layers.
 - SQL (Structured Query Language).
 - Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
 - Microsoft SQL Reporting Services. Recommend 2008 R2.
 - XML (external interfaces).

Any exceptions to the Electronic File Format requirements above must be approved in writing by the CAM. The CAM will consult with the CEC's Information Technology Services Branch to determine whether the exceptions are allowable.

MEETINGS

Subtask 1.2 Kick-off Meeting

The goal of this subtask is to establish the lines of communication and procedures for implementing this Agreement.

The Recipient shall:

- Attend a "Kick-off" meeting with the CAM, and other CEC staff relevant to the Agreement. The Recipient's Project Manager and any other individuals deemed necessary by the CAM or the Project Manager shall participate in this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting. Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., Teams, Zoom), with approval of the CAM.

The Kick-off meeting will include discussion of the following:

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
- An updated Project Schedule;
- Terms and conditions of the Agreement;
- Invoicing and auditing procedures;

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- Travel;
 - Equipment purchases;
 - Administrative and Technical products (subtask 1.1);
 - CPR meetings (subtask 1.3);
 - Monthly Calls (subtask 1.5)
 - Quarterly Progress reports (subtask 1.6)
 - Final Report (subtask 1.7)
 - Match funds (subtask 1.8);
 - Permit documentation (subtask 1.9);
 - Subawards (subtask 1.10);
 - Technical Advisory Committee meetings (subtasks 1.11 and 1.12);
 - Agreement changes;
 - Performance Evaluations; and
 - Any other relevant topics.
- Provide *Kick-off Meeting Presentation* to include but not limited to:
 - Project overview (i.e. project description, goals and objectives, technical tasks, expected benefits, etc.)
 - Project schedule that identifies milestones
 - List of potential risk factors and hurdles, and mitigation strategy
 - Provide an *Updated Project Schedule*, *Match Funds Status Letter*, and *Permit Status Letter*, as needed to reflect any changes in the documents.

The CAM shall:

- Designate the date and location of the meeting.
- Send the Recipient a *Kick-off Meeting Agenda*.

Recipient Products:

- Kick-off Meeting Presentation
- Updated Project Schedule (*if applicable*)
- Match Funds Status Letter (subtask 1.7) (*if applicable*)
- Permit Status Letter (subtask 1.8) (*if applicable*)

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

The goal of this subtask is to determine if the project should continue to receive CEC funding, and if so whether any modifications must be made to the tasks, products, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the CEC and the Recipient. As determined by the CAM, discussions may include project status, challenges, successes, advisory group findings and recommendations, final report preparation, and progress on technical transfer and production readiness activities (if applicable). Participants will include the CAM and the Recipient and may include the CAO and any other individuals selected by the CAM to provide support to the CEC.

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit.

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However, the CAM may schedule additional CPR meetings as necessary. The budget may be reallocated to cover the additional costs borne by the Recipient, but the overall Agreement amount will not increase. CPR meetings generally take place at the CEC, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

The Recipient shall:

- Prepare and submit a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

- Determine the location, date, and time of each CPR meeting with the Recipient's input.
- Send the Recipient a *CPR Agenda* with a list of expected CPR participants in advance of the CPR meeting. If applicable, the agenda may include a discussion of match funding and permits.
- Conduct and make a record of each CPR meeting. Provide the Recipient with a schedule for providing a Progress Determination on continuation of the project.
- Determine whether to continue the project, and if so whether modifications are needed to the tasks, schedule, products, or budget for the remainder of the Agreement. A determination of unsatisfactory progress This may result in project delays, including a potential Stop Work Order, while the CEC determines whether the project should continue.
- Provide the Recipient with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Recipient revise one or more products.

Recipient Products:

- CPR Report(s)

CAM Products:

- CPR Agenda(s)
- Progress Determination

Subtask 1.4 Final Meeting

The goal of this subtask is to complete the closeout of this Agreement.

The Recipient shall:

- Meet with CEC staff to present project findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement. This meeting will be attended by the Recipient and CAM, at a minimum. The meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

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The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM of the following Agreement closeout items:
 - Disposition of any procured equipment.
 - The CEC's request for specific "generated" data (not already provided in Agreement products).
 - Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
 - "Surviving" Agreement provisions such as repayment provisions and confidential products.
 - Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide copies of *All Final Products* organized by the tasks in the Agreement.

Products:

- Final Meeting Agreement Summary (*if applicable*)
- Schedule for Completing Agreement Closeout Activities
- All Final Products

MONTHLY CALLS, REPORTS AND INVOICES

Subtask 1.5 Monthly Calls

The goal of this task is to have calls at least monthly between the CAM and Recipient to verify that satisfactory and continued progress is made towards achieving the objectives of this Agreement on time and within budget.

The objectives of this task are to verbally summarize activities performed during the reporting period, to identify activities planned for the next reporting period, to identify issues that may affect performance and expenditures, to verify match funds are being proportionally spent concurrently or in advance of CEC funds or are being spent in accordance with an approved Match Funding Spending Plan, to form the basis for determining whether invoices are consistent with work performed, and to answer any other questions from the CAM. Monthly calls might not be held on those months when a quarterly progress report is submitted or the CAM determines that a monthly call is unnecessary.

The CAM shall:

- Schedule monthly calls.
- Provide questions to the Recipient prior to the monthly call.
- Provide call summary notes to Recipient of items discussed during call.

The Recipient shall:

- Review the questions provided by CAM prior to the monthly call

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- Provide verbal answers to the CAM during the call.

Product:

- Email to CAM concurring with call summary notes.

Subtask 1.6 Quarterly Progress Reports and Invoices

The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

The Recipient shall:

- Submit a *Quarterly Progress Report* to the CAM. Each progress report must:
 - Summarize progress made on all Agreement activities as specified in the scope of work for the reporting period, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Progress reports are due to the CAM the 10th day of each January, April, July, and October. The Quarterly Progress Report template can be found on the ECAMS Resources webpage available at: <https://www.energy.ca.gov/media/4691>
- Submit a monthly or quarterly *Invoice* on the invoice template(s) provided by the CAM.

Recipient Products:

- Quarterly Progress Reports
- Invoices

CAM Product:

- Invoice template

Subtask 1.7 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. When creating the Final Report Outline and the Final Report, the Recipient must use the CEC Style Manual provided by the CAM.

Subtask 1.7.1 Final Report Outline

The Recipient shall:

- Prepare a *Final Report Outline* in accordance with the *Energy Commission Style Manual* provided by the CAM.

Recipient Products:

- Final Report Outline (draft and final)

CAM Products:

- Energy Commission Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

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Subtask 1.7.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Energy Commission Style Manual, and Final Report Template provided by the CAM with the following considerations:
 - Ensure that the report includes the following items, in the following order:
 - Cover page (**required**)
 - Credits page on the reverse side of cover with legal disclaimer (**required**)
 - Acknowledgements page (optional)
 - Preface (**required**)
 - Abstract, keywords, and citation page (**required**)
 - Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
 - Executive summary (**required**)
 - Body of the report (**required**)
 - References (if applicable)
 - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
 - Bibliography (if applicable)
 - Appendices (if applicable) (Create a separate volume if very large.)
 - Attachments (if applicable)
- Submit a draft of the Executive Summary to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments on Draft Final Report* received on the Executive Summary. For each comment received, the Recipient will identify in the summary the following:
 - Comments the Recipient proposes to incorporate.
 - Comments the Recipient does propose to incorporate and an explanation for why.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt.
- Incorporate all CAM comments into the *Final Report*. If the Recipient disagrees with any comment, provide a *Written Responses to Comments* explaining why the comments were not incorporated into the final product.
- Submit the revised *Final Report* electronically with any Written Responses to Comments within 10 days of receipt of CAM's Written Comments on the Draft Final Report, unless the CAM specifies a longer time period or approves a request for additional time.

Products:

- Summary of TAC Comments on Draft Final Report
- Draft Final Report
- Written Responses to Comments (*if applicable*)
- Final Report

CAM Product:

- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBAWARDS

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Subtask 1.8 Match Funds

The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Recipient may spend match funds for this task. Match funds must be identified in writing, and the Recipient must obtain any associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement. If no match funds were part of the application that led to the CEC awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

If match funds were a part of the application that led to the CEC awarding this Agreement, then provide in the letter:

- A list of the match funds that identifies:
 - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
 - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.
 - If different from the solicitation application, provide a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:

- Match Funds Status Letter
- Supplemental Match Funds Notification Letter (*if applicable*)
- Match Funds Reduction Notification Letter (*if applicable*)

Subtask 1.9 Permits

The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are not reimbursable under

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this Agreement, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
 - A list of the permits that identifies: (1) the type of permit; and (2) the name, address, and telephone number of the permitting jurisdictions or lead agencies.
 - The schedule the Recipient will follow in applying for and obtaining the permits.

The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.

- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

- Permit Status Letter
- Updated List of Permits (*if applicable*)
- Updated Schedule for Acquiring Permits (*if applicable*)
- Copy of Each Approved Permit (*if applicable*)

Subtask 1.10 Obtain and Execute Subawards and Agreements with Site Hosts

The goals of this subtask is to ensure quality products and to execute subrecipients and site host agreements, as applicable, required to carry out the tasks under this Agreement consistent with the Agreement Terms and Conditions and the Recipient's own procurement and contracting policies and procedures.

The Recipient shall:

- Execute and manage subawards and coordinate subrecipient activities.
- Execute and manage site host agreements, and ensure the right to use the project site throughout the term of the Agreement, as applicable. A site host agreement is not required if the Recipient is the site host.
- Notify the CEC in writing immediately, but no later than five calendar days, if there is a reasonable likelihood the project site cannot be acquired or can no longer be used for the project.
- Submit a letter to the CAM describing the subawards and any site host agreement needed or stating that no subawards or site host agreements are required.
- If requested by the CAM, submit a draft of each subaward and any site host agreement required to conduct the work under this Agreement to the CAM for review.

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- If requested by the CAM, submit a final copy of each executed subaward and any site host agreement.
- If Recipient intends to add new subrecipients or change subrecipients, then the Recipient shall notify the CAM.

Products:

- Letter describing the subawards needed, or stating that no subawards are required
- Draft subaward (if requested)
- Final subaward (if requested)
- Draft site host agreement (if requested)
- Final site host agreement (if requested)

TECHNICAL ADVISORY COMMITTEE

Subtask 1.11 Technical Advisory Committee (TAC)

The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
 - Technical area expertise;
 - Knowledge of market applications; or
 - Linkages between the Agreement work and other past, present, or future projects (both public and private sectors) that TAC members are aware of in a particular area.
- Review products and provide recommendations for needed product adjustments, refinements, or enhancements.
- Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.
- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.
- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate, to the extent the TAC members feel is appropriate, on behalf of the project in its effort to build partnerships, governmental support, and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.

The TAC may be composed of qualified professionals spanning the following types of disciplines:

- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives);

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- Public interest market transformation implementers;
- Product developers relevant to the project;
- U.S. Department of Energy research managers, or experts from other federal or state agencies relevant to the project;
- Public interest environmental groups;
- Utility representatives;
- Air district staff; and
- Members of relevant technical society committees.

The Recipient shall:

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, and phone numbers of potential members. The list will be discussed at the Kick-off meeting, and a schedule for recruiting members and holding the first TAC meeting will be developed.
- Recruit TAC members. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.12.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.
- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

Products:

- List of Potential TAC Members
- List of TAC Members
- Documentation of TAC Member Commitment

Subtask 1.12 TAC Meetings

The goal of this subtask is for the TAC to provide strategic guidance for the project by participating in regular meetings, which may be held via teleconference.

The Recipient shall:

- Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the number and location of meetings (in-person and via teleconference) in consultation with the CAM.
- Prepare a *TAC Meeting Schedule* that will be presented to the TAC members during recruiting. Revise the schedule after the first TAC meeting to incorporate meeting comments.
- Prepare a *TAC Meeting Agenda* and *TAC Meeting Back-up Materials* for each TAC meeting.
- Organize and lead TAC meetings in accordance with the TAC Meeting Schedule. Changes to the schedule must be pre-approved in writing by the CAM.
- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

The TAC shall:

- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.

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- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.
- Review and provide comments to proposed project performance metrics.
- Review and provide comments to proposed project Draft Technology Transfer Plan.

Products:

- TAC Meeting Schedule (draft and final)
- TAC Meeting Agendas (draft and final)
- TAC Meeting Back-up Materials
- TAC Meeting Summaries

Subtask 1.13 Project Performance Metrics

The goal of this subtask is to finalize key performance targets for the project based on feedback from the TAC and report on final results in achieving those targets. The performance targets should be a combination of scientific, engineering, techno-economic, and/or programmatic metrics that provide the most significant indicator of the research or technology's potential success.

The Recipient shall:

- Complete and submit the project performance metrics section of the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task, to the CAM.
- Present the draft project performance metrics at the first TAC meeting to solicit input and comments from the TAC members.
- Develop and submit a *TAC Performance Metrics Summary* that summarizes comments received from the TAC members on the proposed project performance metrics. The *TAC Performance Metrics Summary* will identify:
 - TAC comments the Recipient proposes to incorporate into the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
 - TAC comments the Recipient does not propose to incorporate with and explanation why.
- Develop and submit a *Project Performance Metrics Results* document describing the extent to which the Recipient met each of the performance metrics in the *Final Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
- Discuss the *Project Performance Metrics Results* at the Final Meeting.

Products:

- TAC Performance Metrics Summary
- Project Performance Metrics Results

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IV. TECHNICAL TASKS

TASK 2 DEVELOPMENT OF OPTIMIZATION FRAMEWORK FOR CONSTRUCTION ELECTRIC EQUIPMENT (CEVs) CHARGING AND MOBILE CHARGING STATIONS (MCSS) RE-CHARGING SCHEDULE

The goal of this task is to develop an optimization framework that produces charging strategies to support CEVs using the fleet of MCSSs, optimizing for electricity costs and carbon emissions and using models of all system components and relevant constraints.

The Recipient shall:

- Establish an optimization framework for determining the optimal location, timing, and rates for CEV charging and MCS re-charging. The optimization framework will minimize carbon emissions, charging costs of MCSSs and charging time of CEVs, subject to the construction schedule requirement, power/energy capacity constraints of MCSSs, CEVs, and the grid.
- Use the optimization framework to generate different case studies to assess the benefits of MCSSs for CEVs operation. The case studies will be based on the intended construction site deployments at the UC San Diego campus.
 - List the potential cases (number and type of MCSSs, and numbers and types of CEVs).
 - List the potential scenarios (working schedules for CEVs, charging rates and charging needs, and downtime).
- Quantify the expected benefits of MCSSs in the modeled scenarios including operational cost savings, reduced carbon and air pollutant emissions, and charging time savings for CEVs.
- Compare the modeled scenarios of no MCSSs, MCSSs without the optimal scheduling approach, and MCSSs with optimal scheduling in terms of charging costs, peak power demand and carbon emissions, and total charging time (including travel, waiting, and charging) spent.
- Prepare a report on *MCS-CEV Optimization Framework Description and Summary* that includes the MCS and CEV models, case study results, comparisons of the operation strategies, cost and benefit evaluations, and a discussion of whether the goals and objectives described in Section II.B. of this Scope of Work were achieved.
- Prepare a *CPR Report #1* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:

- MCS-CEV Optimization Framework Description and Summary (draft and final)
- CPR Report #1

TASK 3 INSTALLATION, DATA ANALYTICS, AND MODELING OF MCSS AND CEVS

The goal of this task is to install the MCSSs and CEVs at the UC San Diego campus, collect data, and analyze the collected data to refine the energy consumption and charging demand models of different types of MCSSs and CEVs. The refined models will be used to improve the charging strategy optimizations using the MCS-to-CEV Optimization Framework developed in Task 2.

The Recipient shall:

- Arrange for delivery of the MCSSs and CEVs to the UC San Diego campus.

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- Prepare a *List of Construction Site Deployments* detailing the attributes of the construction sites where the MCSs and CEVs will be deployed, including the number of MCSs and CEVs and potential charging locations.
- Prepare an *MCS Delivery and Installation Schedule* detailing the dates of critical milestones for commissioning the MCSs at the UC San Diego campus.
- Prepare a *CEV Delivery and Installation Schedule* detailing the dates of critical milestones for commissioning the CEVs at the UC San Diego campus.
- Install data logging devices onto CEVs operating at construction sites
- Collect existing data (historical equipment data and literature) as well as newly collected data from the current demonstration on CEVs, including power and energy consumption values in different operation modes.
- Perform a correlation analysis between the existing and newly collected data to refine models of CEV energy consumption.
- Describe the external factors (e.g., adverse weather conditions) that might affect CEV charging demands, and MCS charging/discharging operations.
- Obtain machine learning models for the energy consumption of different types of CEVs and MCSs.
- Evaluate model accuracy on various scenarios and assumptions through comparisons with state-of-the-art models presented in the literature.
- Use the improved CEV and MCS energy consumption models to derive improved optimized charging schedules using the Task 2 MCS-to-CEV Optimization Framework. The obtained optimal MCS charging schedules will be used in Task 4 demonstration stage.
- Document data analysis and models for each type of MCSs and CEVs in the *MCS and CEV Data and Modeling Presentation*.

Products:

- List of Construction Site Deployments
- MCS Delivery and Installation Schedule
- CEV Delivery and Installation Schedule
- MCS and CEV Data and Modeling Presentation

TASK 4 MCS-TO-CEV TESTING AND DEMONSTRATION

The goal of this task is to test and demonstrate the cost-effectiveness of using MCSs for charging CEVs at multiple construction host sites at UC San Diego, recharging of the MCSs at different times of the day, and relocation to different construction sites for optimal charging of CEVs while considering grid benefits.

The Recipient shall:

- Perform the project demonstration at multiple construction sites and prepare an *MCS-to-CEV Initial Report* summarizing initial demonstration results, including the cost-effectiveness of using MCSs for charging CEVs at an initial construction demonstration site at UC San Diego.
- Conduct a systematic experiment to charge all the CEVs located at different construction sites to evaluate the performance of MCSs and proposed scheduling approaches under different conditions (e.g., hours of operation, charging rates and needs, downtimes) and prepare the *MCS-to-CEV Midterm Report* to summarize the following:
 - Midterm updates on the construction site demonstrations.
 - Evaluations of benefits such as: 1) CEVs over ICE construction equipment, in terms of reduced operation costs, lower carbon emissions, and decreased

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- air/noise pollutant levels; 2) prove the benefits of MCSs over current fixed EV charging stations, in terms of peak demand reduction, deferred grid upgrade costs, and reduced charging time.
- Advance the DC fast charger port (CCS1) from TRL 6 to TRL 8 through validation at the demonstration site; and test one next-gen mobile battery unit that supports fast charging at 150 KW for construction equipment charging during the project demonstration period (TRL 5 to TRL 7).
- Develop and demonstrate a rapid charging battery system for a prototype mini-excavator equipment in a laboratory setting.
- Prepare an *MCS-to-CEV Final Report* that summarizes the following:
 - R&D results pertaining to improvements on the mobile battery units including DC fast charger (CCS1) capability on the existing unit and 150 kW fast charging capability for the next-gen unit.
 - R&D results pertaining to the rapid charging battery system laboratory demonstration including charging rate and estimated cycle life.
 - Evaluation of how using MCSs and optimal scheduling approaches for charging of CEVs can minimize the operating costs, total charging time, peak demand reduction, and decreased carbon and air pollutant emissions of the construction sites.
- Prepare a *CPR Report #2* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:

- MCS-to-CEV Initial Report
- MCS-to-CEV Midterm Report
- MCS-to-CEV Final Report (draft and final)
- CPR Report #2

TASK 5: MCS-TO-GRID OPTIMIZATION AND DEMONSTRATION DURING EMERGENCY SITUATIONS

The goal of this task is to use the mobility and high-capacity batteries of MCSs to provide reliability and resiliency of the microgrid, especially during emergency situations and power outages.

The Recipient shall:

- Analyze the grid benefits of the MCS-to-CEV demonstration using demonstration data collected in Task 4 and 3 in terms of increased charging station utilization and renewable self-consumption rates.
- In a Battery-to-Building application, connect an MCS to the UC San Diego DERConnect building and supply energy for a certain period to examine the potential benefits of MCSs for emergency backup power to support critical loads.
- Carry out the tests for a target period of one hour for ten different periods to prove the applicability and reliability of MCSs for MCS-to-Grid operations and document the results.
- Measure power and energy values during the one-hour test periods.
- Prepare a *Best Practices for MCS-To-Grid Operating Strategies and Grid Benefit Brief* that summarizes the grid benefits of MCS-to-CEV charging and the reliability of MCSs for MCS-to-Grid operations for emergency building services.

Products:

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- Best Practices for MCS-To-Grid Operating Strategies and Grid Benefit Brief

TASK 6: EVALUATION OF PROJECT BENEFITS

The goal of this task is to report the benefits resulting from this project.

The Recipient shall:

- Complete the *Initial Project Benefits Questionnaire*. The Initial Project Benefits Questionnaire shall be initially completed by the Recipient with 'Kick-off' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Complete the *Annual Survey* by January 31st of each year. The Annual Survey includes but is not limited to the following information:
 - Technology commercialization progress
 - New media and publications
 - Company growth
 - Follow-on funding and awards received
- Complete the *Final Project Benefits Questionnaire*. The Final Project Benefits Questionnaire shall be completed by the Recipient with 'Final' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Respond to CAM questions regarding the questionnaire drafts.
- Complete and update the project profile on the CEC's public online project and recipient directory on the Energize Innovation website (www.energizeinnovation.fund), and provide *Documentation of Project Profile on EnergizeInnovation.fund*, including the profile link.
- If the Prime Recipient is an Innovation Partner on the project, complete and update the organizational profile on the CEC's public online project and recipient directory on the Energize Innovation website (www.energizeinnovation.fund), and provide *Documentation of Organization Profile on EnergizeInnovation.fund*, including the profile link.

Products:

- Initial Project Benefits Questionnaire
- Annual Survey(s)
- Final Project Benefits Questionnaire
- Documentation of Project Profile on EnergizeInnovation.fund
- Documentation of Organization Profile on EnergizeInnovation.fund

TASK 7 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to ensure the technological learning that resulted from the demonstration(s) is captured and disseminated to the range of professions that will be responsible for future deployments of this technology or similar technologies.

The Recipient Shall:

- Develop and submit a *Project Case Study Plan* that outlines how the Recipient will document the planning, construction, commissioning, and operation of the technology or system being demonstrated. The Project Case Study Plan should include:
 - An outline of the objectives, goals, and activities of the case study.
 - The organization that will be conducting the case study and the plan for conducting it.

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- A list of professions and practitioners involved in the technology's deployment.
- Specific activities the recipient will take to ensure the learning that results from the project is disseminated to those professions and practitioners.
- Presentations/webinars/training events to disseminate the results of the case study.
- Present the draft *Project Case Study Plan* to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments* that summarizes comments received from the TAC members on the draft *Project Case Study Plan*. This document will identify:
 - TAC comments the Recipient proposes to incorporate into the final *Technology Transfer Plan*.
 - TAC comments the Recipient does not propose to incorporate with and explanation why.
- Submit the final *Project Case Study Plan* to the CAM for approval.
- Execute the final Project Case Study Plan and develop and submit a Project Case Study.
- When directed by the CAM, develop presentation materials for a CEC sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California CEC.
- Provide at least (6) six High Quality Digital Photographs (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.

Products:

- Project Case Study Plan (draft and final)
- Summary of TAC Comments
- Project Case Study (draft and final)
- High Quality Digital Photographs

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.